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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,471	02/08/2002	Paul A. Koning	42390P12137	9970

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EXAMINER

DUONG, THO V

ART UNIT	PAPER NUMBER
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3743

DATE MAILED: 08/26/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/071,471

Applicant(s)

KONING ET AL.

Examiner

Tho v Duong

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-- The MAILING DATE of this communication appears n the cover sheet with the c rrespondence address --

Peri d f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-17,19-22 and 26-29 is/are pending in the application.
- 4a) Of the above claim(s) 29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-17,19-22 and 26-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Newly submitted claim 29 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1,3,5-17,19-22 and 26-29 are drawn to an invention of a thermal interface, classified in class 165, subclass 185.
- II. Claim 29 is drawn to an invention of a method making a thermal interface, classified in class 29, subclass 890.03.

The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the thermal interface as claimed can be made by another and materially different process such as pre-coating the non-fusible with a fusible material and then mix them into the polymer binder without a further step of heating. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 29 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Arguments

Receipt of applicant's amendment is acknowledged and entered as Paper #6.

Applicant's arguments with respect to claims 1,3,5-17,19-22 and 26-28 have been considered but are moot in view of the new ground(s) of rejection.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the claimed subject matter of "a fusible filler randomly positioned within the binder material and a plurality of non-fusible particles randomly positioned within the binder material"; "the non-fusible particles comprise a plurality of irregularly shaped particles" and "the binding material is not adhesive" are not described in the specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1,3,5-17,19 and 26-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claimed subject matter of "a plurality of fusible filler randomly

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positioned within the binder material” is not described in the original disclosure. In contrast, applicant discloses in figure 4, that the fusible filler has to be located in such a way that they are in surrounding or coating the non-fusible material. Therefore, the fusible filler has to be positioned non-randomly within the binder material. As regarding claim 26, the claimed subject matter of “the non-fusible particles comprise a plurality of irregularly shaped particles” is not supported in the original disclosure. As regarding claim 28, the claimed subject matter of “the bonding material is non-adhesive” is not supported in the original disclosure. The original disclosure describes in claim 7 that the binder material acts as an adhesive.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8,14,19 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 8, 14 and 19 depend on claim 2, which has been cancelled. Therefore, it is not clear what the scopes of these claims are. As regarding claim 26, the claimed subject matter of “the non-fusible particles comprise a plurality of irregularly shaped particles” renders the scope of the claim indefinite since it is not clear what shape applicant is claiming because it is not known in the art or defined in the specification what shape is irregularly shape.

Claims 1,3,5-17,19 and 26-28 are further rejected as best can be understood by the examiner in which the fusible filler is coated onto each of the non-fusible particle that are randomly positioned within the binder material.

Claim Rejections - 35 USC § 102

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,3,5,6,7,9,10,15,16,17, 20-22 and 27-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Kang et al. (US 6,059,952). Kang discloses (figure 3, and column 5, lines 10-18) that a thermal interface material comprising a polymer paste material (polymer); a fusible filler (tin) coated onto a plurality of non-fusible particles (Cu); and the pre-coated non-fusible particles randomly positioned within the binder material. Kang further discloses (column 5, lines 10-18 and column 6, lines 31-34) that the fusible filler can be Sn, In, Bi, Sb and their alloys while the non-fusible particles can be silver. It is well known in the art that tin has a melting point at 120C degrees, indium at 159 degrees and copper or silver has thermal conductivity greater than the thermal conductivity of tin. As regarding claim 16, Tin and Indium, which are the materials, selected to use as the claimed fusible material. Therefore, it is inherently that either tin or indium to have the property such as “stable to oxygen at temperature up to approximately 150C and relative humidity up to approximately 90%”. Kang further discloses (column 9, lines 57-64, and claim 19) that the polymer can be both adhesive and non-adhesive and the relative amount of the filler powder over the polymer binder varied from 30 to 90% in weight depending on a specific application.

Claims 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Toyota Jidosha (JP 07179832A). Toyota discloses (figures 1-3, and table 4) that a thermal interface material that has a conductive filler (2) embedded within an adhesive material (1) wherein the conductive

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filler comprises of a non-fusible particle of silver (20) and a solder alloy (21) coated on the particle (20). The solder alloy is selected to be a combination of Bi (57%) and Sn (43%) in order to obtain a melting temperature of 139 degrees (C).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as obvious over Kang. Kang substantially discloses all of applicant's claimed invention as discussed above except for the limitation regarding the physical composition of the thermal interface material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the claimed range of physical composition such as weight and volume between the fusible and the non-fusible particle in view of Kang's physical composition of the fusible and non-fusible particle, since it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. Furthermore, at the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to obtain the claimed range of physical composition between the fusible and non-fusible with the thermal interface material because applicant has not disclosed that the claimed physical range of weight and volume between the fusible and non-fusible, provides an advantage, is used for a particular

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purpose, or solves a stated problem, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well with the physical composition between the fusible and non-fusible material of Kang because Kang's fusible filler has a sufficient amount to completely coat over the non-fusible material.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Avery et al. (US 6,340,113) discloses soldering methods and compositions.

Koning (US 6,365,973) discloses a filled solder.

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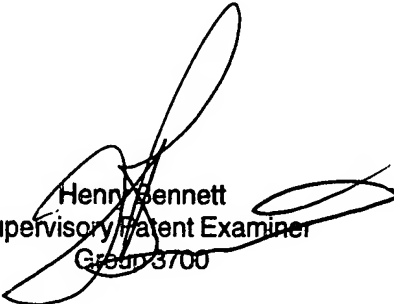
Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tho Duong whose telephone number is (703) 305-0768. The examiner can normally be reached on from 9:30-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennet, can be reached on (703) 308-0101. The fax phone number for the organization where this application or proceeding is assigned is (703)308-7764.

Any inquiry of a general nature or relating to status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0861.

Tho Duong

August 23, 2003


Henry Bennett
Supervisory Patent Examiner
Group 3700